Ministerie van Verkeer en Waterstaat

The Environmental Perspective of the Rhine

Navigation and EU Water Framework Directive

Margriet Schoor, Rijkswaterstaat, The Netherlands

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The Dutch Rhine

Navigable rivers in western Europe

Connects Port Rotterdam with rest of Europe

The Rhine Delta

Navigation on the Rhine

Busiest river in Europe

165,000 ships/year (max 6-barge tugs)

160 million ton goods/year

photo: B. Boekhoven

Dutch Government policies on main river interests

- Increase flood protection levels
- Increase inland water transport potentials
- AND increase ecological potentials

Today the European Water Framework Directive (WFD) plays a structuring role


Doesburg

EU Water Framework Direction

What's in the law?

- Make water quality (chemical & ecological) as good as possible.
- Maintaining navigation, flood control and water supply.
- Before 2015 (delay 2027)

Biological Water Quality

algae

fish

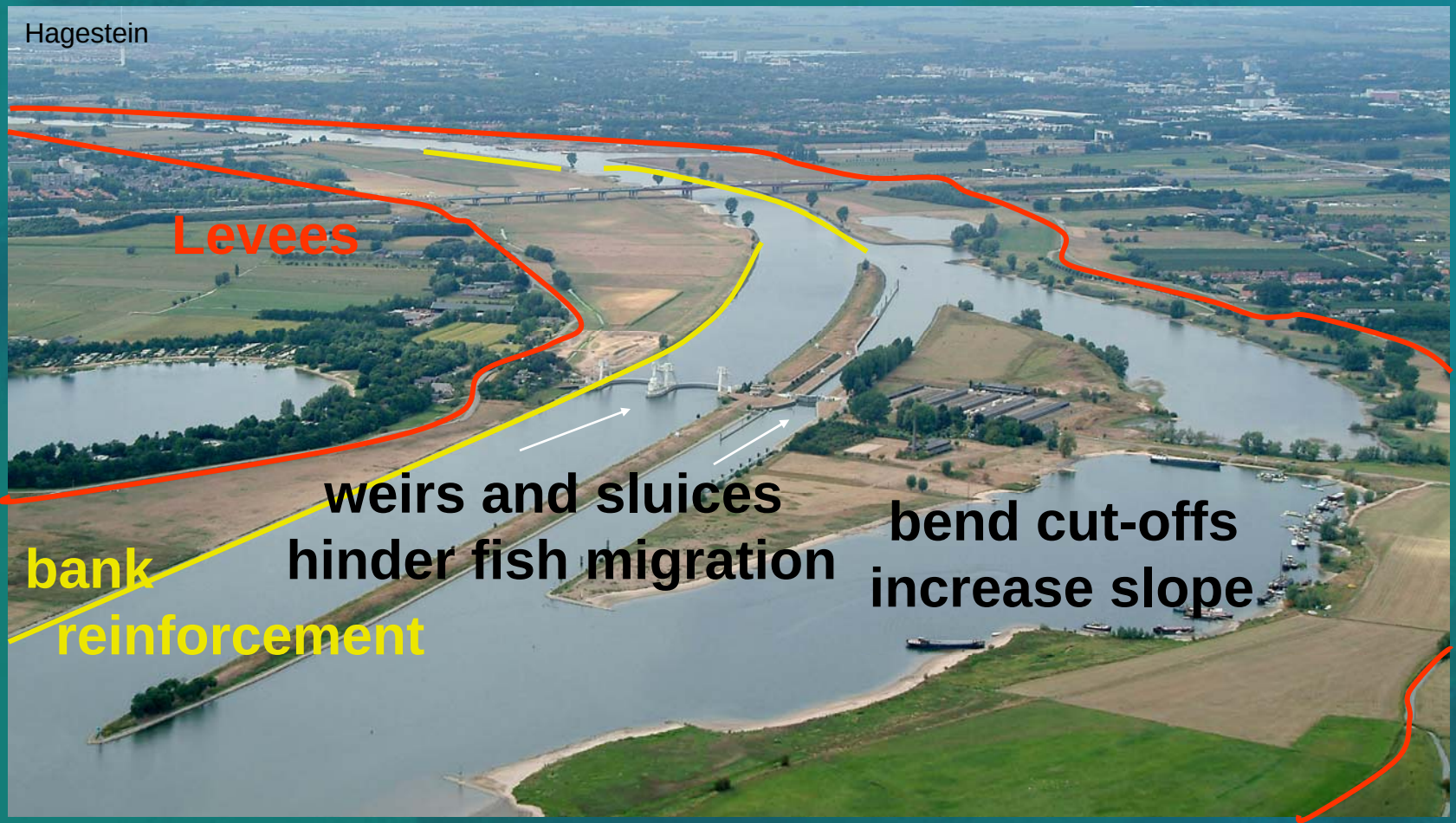
macro invertebrates

water plants

The Rhine in the Netherlands

photo: B. Boekhoven

The Rhine in the Netherlands



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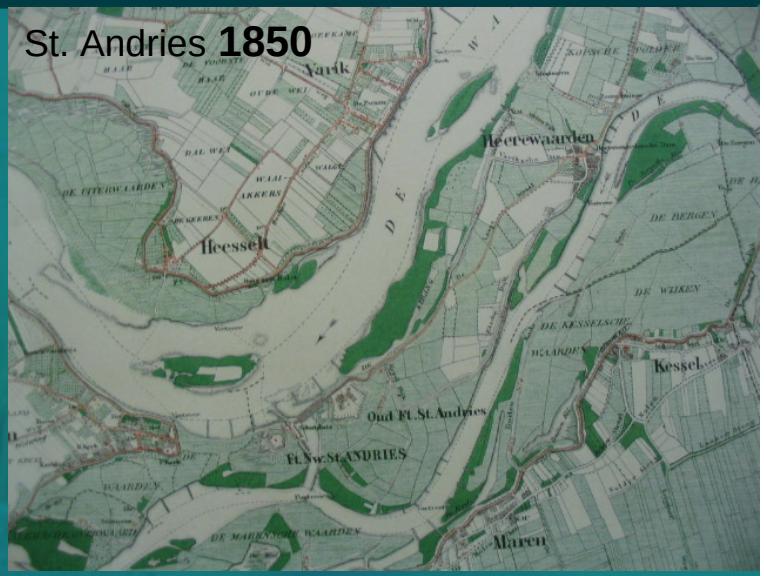
2 major effects of navigation

1. Lack of shallow flowing water
   (due to straightening and deepening)
2. High exposure to waves and suction

St. Andries **1850**



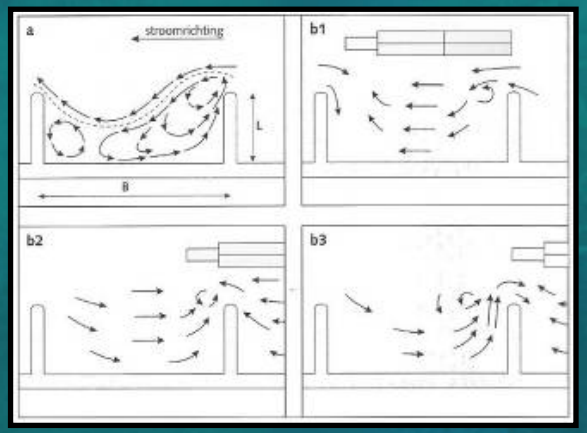


photo: B. Boekhoven

Biological needs

Shallow and clear water with low turbulence

River bed with low turbulence
Sandy banks & woody debris & water plants

Slow flowing water for resting and young fish,
Spawning grounds like flooded grassland and sand bars
Free migration in river basin

Current situation → few amounts of specific riverine species

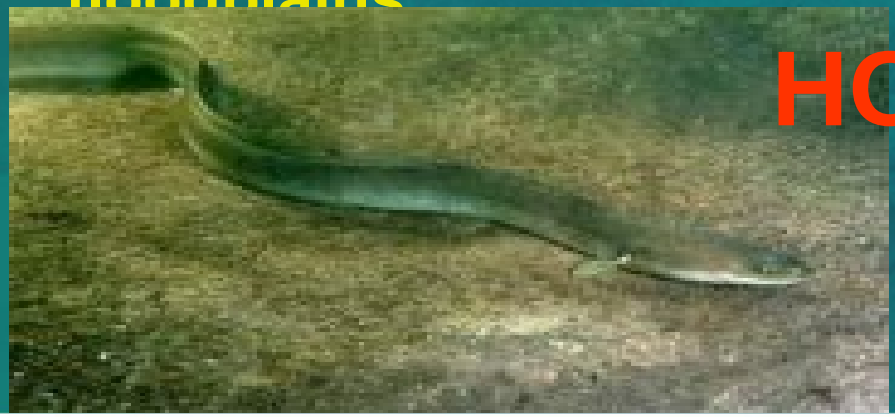
Perspective of the Rhine

- Navigation channel suitable for migration and dispersion of species

Conditions: fish passages in weirs,
annual flood pulse in floodplain

- Navigation channel is not a good habitat

Improve habitats near banks and in floodplains



HOW?

Fish passages

constructed 2001-2004

For upstream migration of fish

Amerongen

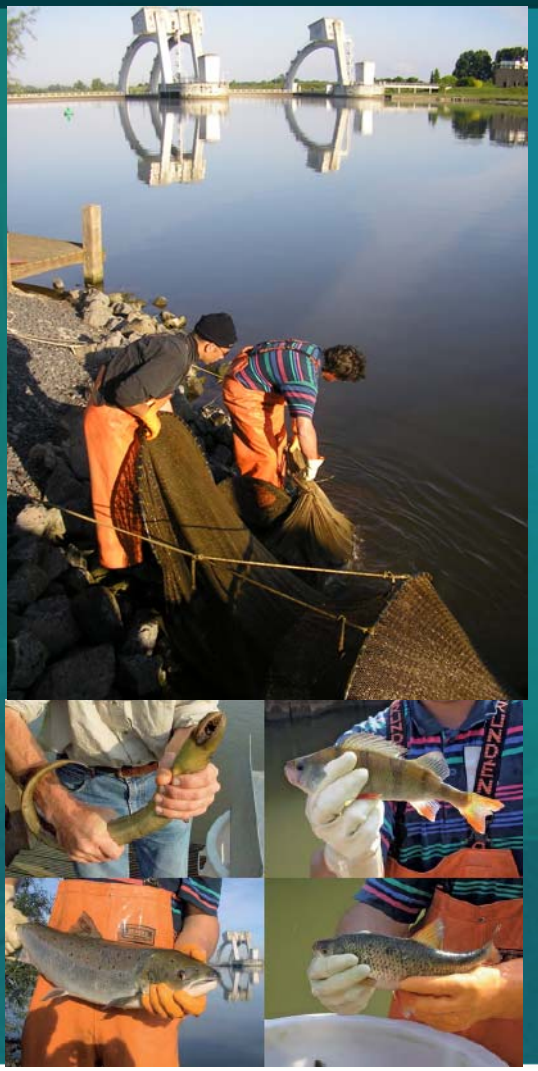
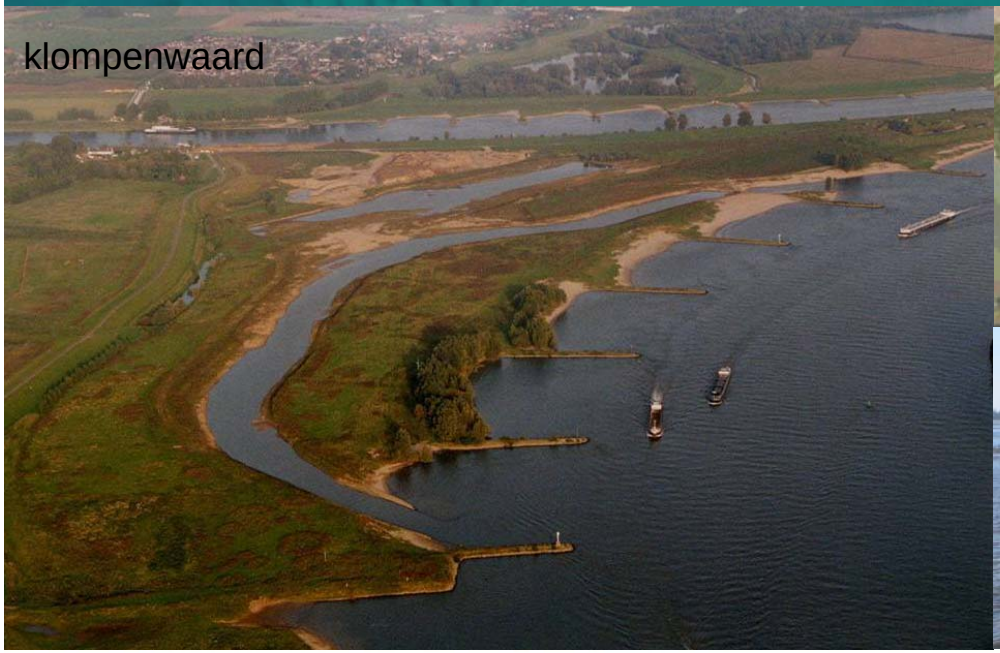


photo: B. Boekhoven

Side channels

- 3 pilots show good results
- Slow flowing water, natural banks
- Controlled discharge (max 3%) to prevent sedimentation in navigation channel
- Inflow in outer bend to prevent sanding up side channel



Small channel in groyne fields

- Stop bank erosion
- Slow flowing water, no waves
- Lots of (young) fish

photo: B. Boekhoven

Removal of bank revetment

IJssel Engelse werk

- New groynes (right bank)
- Sandy banks, tolerated bank erosion
- Eroded sediment is transported, no accretion in navigation channel

photo: B. Boekhoven

Removal of rip rap

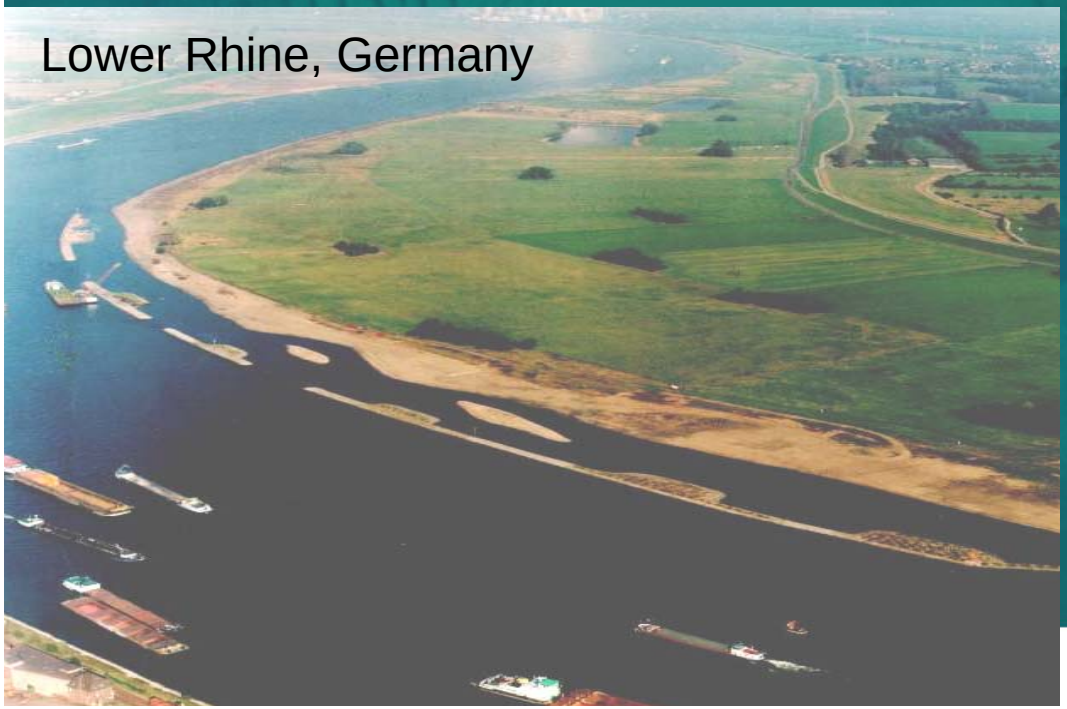
- There is a lot to be done
- Also needed: better connection with streams
  -> fish migration from sea to source


IJssel Doesburg


Voorster beek flowing into IJssel

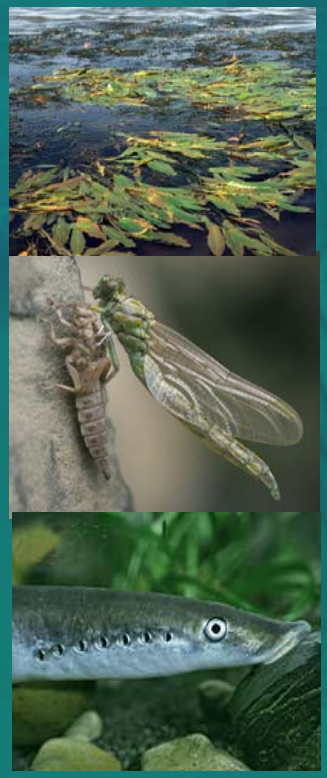
Future challenges in river management

- Need for deeper and wider navigation channel due to bigger ships
- Climate change: increase of low & high discharges
- Stop river bed degradation (instability constructions)
- Improve Ecology


Lower Rhine, Germany

Idea for 35 km parallel dams, with good chances for ecology

The environmental perspective of the Rhine



- Monitoring of side channels, rip rap removal and fish passages show fortifying results
- Amount of specific riverine specific species is growing, due too creating habitats near banks and floodplain
- It is not enough yet
- Possible win-win situation is crucial in financing
  ecology – navigation (parallel dams)
  ecology – flood protection (side channels)

Thank you for your attention!

photo: B. Boekhoven

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